

	A	B	C	D	E	F	G	H	I	J	K	L	
1				Background Statistics for Data Sets with Non-Detects									
2	User Selected Options												
3	Date/Time of Computation			7/30/2013 11:40:45 AM									
4	From File			WorkSheet.xls									
5	Full Precision			OFF									
6	Confidence Coefficient			95%									
7	Coverage			95%									
8	rent or Future K Observations			1									
9	mber of Bootstrap Operations			2000									
10													
11	DDx												
12													
13	General Statistics												
14	Total Number of Observations				67	Number of Missing Observations				0			
15	Number of Distinct Observations				61								
16	Number of Detects				47	Number of Non-Detects				20			
17	Number of Distinct Detects				47	Number of Distinct Non-Detects				14			
18	Minimum Detect				0.2	Minimum Non-Detect				0.18			
19	Maximum Detect				6.695	Maximum Non-Detect				1.8			
20	Variance Detected				1.365	Percent Non-Detects				29.85%			
21	Mean Detected				2.022	SD Detected				1.168			
22	Mean of Detected Logged Data				0.515	SD of Detected Logged Data				0.693			
23													
24	Critical Values for Background Threshold Values (BTVs)												
25	Tolerance Factor K (For UTL)				1.994	d2max (for USL)				3.068			
26													
27	Normal GOF Test on Detects Only												
28	Shapiro Wilk Test Statistic				0.893	Shapiro Wilk GOF Test							
29	5% Shapiro Wilk Critical Value				0.946	Data Not Normal at 5% Significance Level							
30	Lilliefors Test Statistic				0.127	Lilliefors GOF Test							
31	5% Lilliefors Critical Value				0.129	Detected Data appear Normal at 5% Significance Level							
32	Detected Data appear Approximate Normal at 5% Significance Level												
33													
34	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution												
35	Mean				1.563	SD				1.208			
36	95% UTL95% Coverage				3.972	95% KM UPL (t)				3.593			
37	90% KM Percentile (z)				3.111	95% KM Percentile (z)				3.55			
38	99% KM Percentile (z)				4.373	95% KM USL				5.269			
39													
40	DL/2 Substitution Background Statistics Assuming Normal Distribution												
41	Mean				1.566	SD				1.206			
42	95% UTL95% Coverage				3.971	95% UPL (t)				3.593			
43	90% Percentile (z)				3.111	95% Percentile (z)				3.55			
44	99% Percentile (z)				4.372	95% USL				5.266			
45	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons												
46													
47	Gamma GOF Tests on Detected Observations Only												
48	A-D Test Statistic				0.915	Anderson-Darling GOF Test							
49	5% A-D Critical Value				0.757	Data Not Gamma Distributed at 5% Significance Level							
50	K-S Test Statistic				0.133	Kolmogrov-Smirnoff GOF							
51	5% K-S Critical Value				0.13	Data Not Gamma Distributed at 5% Significance Level							
52	Data Not Gamma Distributed at 5% Significance Level												
53													
54	Gamma Statistics on Detected Data Only												
55	k hat (MLE)				2.798	k star (bias corrected MLE)				2.634			
56	Theta hat (MLE)				0.723	Theta star (bias corrected MLE)				0.768			
57	nu hat (MLE)				263	nu star (bias corrected)				247.6			
58	MLE Mean (bias corrected)				2.022								
59	MLE Sd (bias corrected)				1.246	95% Percentile of Chisquare (2k)				11.48			
60													
61	Gamma ROS Statistics using Imputed Non-Detects												
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												

	A	B	C	D	E	F	G	H	I	J	K	L		
63	GROS may not be used when kstar of detected data is small such as < 0.1													
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs													
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates													
66	Minimum					0.01	Mean					1.567		
67	Maximum					6.695	Median					1.275		
68	SD					1.209	CV					0.771		
69	k hat (MLE)					1.525	k star (bias corrected MLE)					1.467		
70	Theta hat (MLE)					1.027	Theta star (bias corrected MLE)					1.068		
71	nu hat (MLE)					204.4	nu star (bias corrected)					196.6		
72	MLE Mean (bias corrected)					1.567	MLE Sd (bias corrected)					1.293		
73	95% Percentile of Chisquare (2k)					7.7	90% Percentile					3.282		
74	95% Percentile					4.111	99% Percentile					5.986		
75	The following statistics are computed using Gamma ROS Statistics on Imputed Data													
76	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods													
77						WH	HW						WH	HW
78	Approx. Gamma UTL with 95% Coverage					4.902	5.274	95% Approx. Gamma UPL					4.109	4.33
79	95% Gamma USL					8.383	9.712							
80														
81	The following statistics are computed using gamma distribution and KM estimates													
82	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods													
83	k hat (KM)					1.675	nu hat (KM)					224.5		
84						WH	HW						WH	HW
85	Approx. Gamma UTL with 95% Coverage					4.877	5.188	95% Approx. Gamma UPL					4.086	4.264
86	95% Gamma USL					8.346	9.526							
87														
88	Lognormal GOF Test on Detected Observations Only													
89	Shapiro Wilk Test Statistic					0.907	Shapiro Wilk GOF Test							
90	5% Shapiro Wilk Critical Value					0.946	Data Not Lognormal at 5% Significance Level							
91	Lilliefors Test Statistic					0.164	Lilliefors GOF Test							
92	5% Lilliefors Critical Value					0.129	Data Not Lognormal at 5% Significance Level							
93	Data Not Lognormal at 5% Significance Level													
94														
95	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects													
96	Mean in Original Scale					1.589	Mean in Log Scale					0.183		
97	SD in Original Scale					1.185	SD in Log Scale					0.789		
98	95% UTL95% Coverage					5.788	95% BCA UTL95% Coverage					4.998		
99	95% Bootstrap (%) UTL95% Coverage					4.522	95% UPL (t)					4.521		
100	90% Percentile (z)					3.3	95% Percentile (z)					4.395		
101	99% Percentile (z)					7.523	95% USL					13.5		
102														
103	Background DL/2 Statistics Assuming Lognormal Distribution													
104	Mean in Original Scale					1.566	Mean in Log Scale					0.131		
105	SD in Original Scale					1.206	SD in Log Scale					0.86		
106	95% UTL95% Coverage					6.333	95% UPL (t)					4.837		
107	90% Percentile (z)					3.432	95% Percentile (z)					4.691		
108	99% Percentile (z)					8.428	95% USL					15.95		
109	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.													
110														
111	Nonparametric Distribution Free Background Statistics													
112	Data appear to follow a Discernible Distribution at 5% Significance Level													
113														
114	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)													
115	Order of Statistic, r					66	95% UTL with95% Coverage					4.998		
116	Approximate f					1.737	Confidence Coefficient (CC) achieved by UTL					0.854		
117	95% UPL					3.263	95% USL					6.695		
118	95% KM Chebyshev UPL					6.867								
119														
120	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background													
121	data set free of outliers and consists of observations collected from clean unimpacted locations.													
122	The use of USL tends to provide a balance between false positives and false negatives provided the data													
123	represents a background data set and when many onsite observations need to be compared with the BTV.													
124														